1. A process for manufacturing a GMR read head on a wafer, comprising the sequential steps of:

(a) providing a lower magnetic shield layer and depositing thereon a lower dielectric layer;

(b) on the lower dielectric layer, depositing a seed layer and then a buffer layer;

(c) on the buffer layer depositing a free layer;

(d) on said free layer, depositing a layer of non-magnetic material;

(e) on said non-magnetic layer, depositing a multi-layer laminate that is suitable for use as a pinned layer;

(f) on the pinned layer, depositing a first capping layer through DC sputtering and, without breaking vacuum, depositing a lead overlay layer on said first capping layer and, through DC sputtering, a second capping layer on said lead overlay layer;

(g) patterning the second capping layer so that it becomes a hard mask and then, using said hard mask, ion beam etching a centrally located first trench to a depth such that all unprotected portions of the lead overlay layer are removed and portions of both first and second capping layers are removed;

(h) annealing the wafer, thereby setting up a pinned layer direction and causing some diffusion of both capping layers into the overlay layer which results in a strengthening of the overlay layer;

(i) forming hard bias and conductor leads by means of a GPC process;

(j) delineating MR sensor height by means of a MR patterning process; and

(k) depositing a second dielectric layer over the entire wafer.

2. The process of claim 1 wherein the step of depositing a lower dielectric layer further comprises first depositing a layer of tantalum, converting said tantalum layer to tantalum oxide and then depositing a layer of aluminum oxide on the tantalum oxide layer.

3. The process of claim 1 wherein the seed layer is selected from the group consisting of nickel-chromium and nickel-iron-chromium.

4. The process of claim 1 wherein the step of depositing the buffer layer further comprises first depositing a layer of ruthenium to a thickness between about 5 and 7 Angstroms and then depositing a layer of copper to a thickness between about 5 and 10 Angstroms.

5. The process of claim 1 wherein the step of depositing the multi-layer laminate that is suitable for use as a pinned layer further comprises first depositing, in succession, layers of cobalt-iron, ruthenium, and cobalt-iron and then depositing a layer of manganese platinum.

6. The process of claim 1 wherein the first capping layer is selected from the group consisting of tantalum, tungsten, and titanium, and is deposited to a thickness between

about 40 and 60 Angstroms.

7. The process of claim 1 wherein the step of depositing withcut breaking vacuum further comprises maintaining a pressure, other than that due to sputtering gases, that is no greater than about 10^{-6} torr.

8. The process of claim 1 wherein the lead overlay layer is selected from the group consisting of gold and copper, and is deposited to a thickness between about 200 and 300 Angstroms.

9. The process of claim 1 wherein the second capping layer is selected from the group consisting of tantalum, titanium, tungsten, and silicon, and is deposited to a thickness between about 150 and 250 Angstroms.

10. The process of claim 1 wherein and the first trench has sidewalls that slope by no more than 45 degrees away from vertical.

11. The process of claim 1 wherein the step of annealing the wafer further comprises heating for between about 5 and 10 hours at a temperature between about 250 and 280 °C in the presence of a magnetic field whose strength is between about 6,000 and 10,000 Oersted.

12. The process of claim 1 wherein the step of forming hard bias and conductor leads by means a GPC process further comprises:

forming a resist liftoff pattern to define said hard bias and conductor lead regions;

using IBE, etching through said lead overlay and GMR layers;

depositing the hard bias layer;

depositing the conductive lead layers; and

removing the liftoff pattern.

13. The process of claim 1 wherein the step of delineating MR sensor height by means of a MR patterning process further comprises:

providing a photoresist mask that defines the MR sensor;

by means of ion beam etching, etching through said GMR layers a small distance into the lower dielectric layer; and

removing the resist mask.

14. A GMR read head device, comprising:

a lower dielectric layer on a lower magnetic shield layer;

on the lower dielectric layer, a seed layer on which is a buffer layer;

on the buffer layer, depositing a free layer on which is a layer of non-magnetic material;

on the non-magnetic layer, a two layer laminate that serves as a pinned layer;

on the pinned layer, a first capping layer having an upper surface;

on the first capping layer a lead overlay layer on which is a second capping layer;

centrally located within the device, a first trench that extends downwards through the lead overlay layer as far as a first distance below the upper surface of the first capping layer and having a 45 degree sidewall;

a pair of second trenches, symmetrically disposed on either side of the first trench, separated from said first trench by a spacing, that extend downwards a second distance into the first dielectric layer and having sloping sidewalls;

in said second trenches; a layer of hard bias material that partly fills the second trenches and that fully coats said sloping sidewalls and that partly overlaps said second capping layer;

a layer of conductor lead material that exactly overlays the layer of hard bias material and that overfills the second trenches; and

a second dielectric layer over the entire device, including the first trench, the first capping layer, and conductor lead layer.

15. The device described in claim 14 wherein the seed layer is selected from the group consisting of nickel-chromium and nickel-iron-chromium.

16. The device described in claim 14 wherein the buffer layer further comprises a layer of ruthenium between about 5 and 7 Angstroms thick and a layer of copper between about

5 and 10 Angstroms thick.

17. The device described in claim 14 wherein the multi-layer laminate that is suitable for use as a pinned layer further comprises, in order, layers of cobalt-iron, ruthenium, cobalt-iron, and manganese platinum.

18. The device described in claim 14 wherein the first capping layer is selected from the group consisting of tantalum, titanium, and tungsten and is between about 50 and 70 Angstroms thick.

19. The device described in claim 14 wherein the lead overlay layer is selected from the group consisting of gold and copper, and is between about 200 and 300 Angstroms thick.

20. The device described in claim 14 wherein the second capping layer is selected from the group consisting of tantalum, titanium, tungsten, and silicon and is between about 150 and 250 Angstroms thick.

21. The device described in claim 14 wherein said first distance below the upper shield and the surface of the first capping layer is between about 140 and 160 Angstroms.

22. The device described in claim 14 wherein said second distance into the first dielectric layer is between about 30 and 40 Angstroms.

23. The device described in claim 14 wherein the spacing that separates the first trench from each of the second trenches is between about 0.1 and 0.15 microns.

24. The device described in claim 14 wherein the first trench has sidewalls that slope by no more than 45 degrees away from vertical and the second trenches have sidewalls that slope by at least 60 degrees away from vertical.